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NEW BOOKS.

Advanced Algebra and Trigonometry. By W. C. BRENKE. New York: The Century Company. Pp. 350.

Professor Brenke has combined and correlated in one book what is usually covered by college freshmen in algebra and trigonometry. Correlation in secondary mathematics has been tried and the experiment with the college work will be watched with interest. The value of the book for review classes in these two subjects could hardly be questioned. Considerable space is devoted to graphic methods and the idea of the derivative is introduced and applied to some of the simpler functions.

Plane and Solid Geometry. Revised by GEORGE WENTWORTH and D. E. SMITH. Boston: Ginn and Company. Pp. 480. \$1.30.

This revised edition is certainly an improvement on the old one. Considerable new matter has been added and the whole rearranged.

An Introduction to Mathematics. By A. N. WHITEHEAD. New York: Henry Holt and Company. Pp. 256. 75 cents.

Mr. Whitehead sets out not to teach mathematics, but to "enable students from the very beginning of their course to know what the science is about and why it is necessarily the foundation of exact thought as applied to natural phenomena." It is just because mathematical ideas are abstract that they supply what is wanted for a scientific description of the course of events, freed from reference to particular persons or particular types of sensation. From this starting-point the author proceeds to explain the true inwardness of variables, dynamics, symbols, generalizations of numbers, coördinate geometry, conic sections, functions, periodicity, trigonometry, the differential calculus, and geometry. It is an admirably clear exposition, illustrated throughout with diagrams; and one which every teacher of mathematics will want to read. Every student should be familiar with its contents.

Vocational Mathematics. By GEORGE WENTWORTH and D. E. SMITH. Boston: Ginn and Company. Pp. 88.

The Hindu-Arabic Numerals. By DAVID EUGENE SMITH and LOUIS C. KARPINSKI. Boston: Ginn and Company. Pp. 160. \$1.25.

Although it has long been known that the numerals ordinarily employed in business, and commonly attributed to the Arabs, are not of Arabic origin, and although numerous monographs have been written concerning their derivation, no single work has yet appeared in which the complete story of their rise and development has been told. In the

preparation of this treatise the authors have examined every important book and monograph that has appeared upon the subject, consulting the principal libraries of Europe as well as America, examining many manuscripts, and sifting the evidence with greatest care. The result is a scholarly discussion of the entire question of the origin of the numerals, the introduction of the zero, the influence of the Arabs, and the spread of the system about the shores of the Mediterranean and into the various countries of Europe.

The work is illustrated with numerous facsimiles from early inscriptions and manuscripts, most of which have not heretofore been published in connection with this subject, and all of which contribute to a very marked degree to an understanding of the problem.

The Courtis Standard Tests in Arithmetic. By S. A. COURTIS. Detroit, Mich., 441 John R. Street. Pp. 40. Manual of Instructions, .25 cts.

Education as a science must always be seriously handicapped by the difficulty of measuring results. Only of recent years has the desirability of measuring educational results been advocated. Even now, so many factors enter into the problem, factors largely of a psychological character, that most of us would hesitate to have the results of our teaching tested, save in a very general way. We are beyond the old notion that examinations are sure tests of effective teaching, and the progressive teacher of today would never admit that his great ambition was to have his pupils successfully pass State Board or College Entrance Tests. Nevertheless, the examination idea, which is not fundamentally wrong, must be postulated in all efficiency tests in mathematics, and efficiency tests are so reasonable in most walks in life, that it seems most probable that there is such a thing as measurable efficiency in mathematical teaching.

Professor S. A. Courtis, head of the department of mathematics and science in the Detroit Home and Day School, has for several years made use of comparative tests for purposes of supervision. During this time he has developed a system of "Standard Tests" which are suitable to test ability in arithmetic as taught in the years preceding the high school. The author suggests the following ways in which they may be useful: as comparative tests, given to many classes under identical conditions; to measure growth during any school year; to show the teacher the weak and strong places in his teaching; to enable principals and superintendents to compare teachers, grades, schools, and even school systems.

Fourteen separate tests, or papers, have been devised—all confined to the four fundamental operations, including easy applications. Each test is timed so that the most rapid pupil will not have completed the work within the limit. Mr. Courtis recognizes that ability in arithmetic is exceedingly complex. Not claiming that his analysis is complete, the author aims to measure the following component abilities: control of knowledge of the fundamental combinations in each of the four operations; control of the symbols, processes, and forms of each of the four